EXECUTIVE SUMMARY

State Route 89A (SR 89A) is a five lane urban arterial roadway that serves as the primary transportation corridor in west Sedona. This facility is a major north-south roadway serving the regional traffic within the Verde Valley and other areas. The Soldiers Pass Area Traffic Study encompasses a section of SR 89A within west Sedona from Posse Ground Road to Airport Road. This study also includes an evaluation of traffic conditions from Airport Road to Brewer Road in order to understand any traffic pattern changes that may occur due to any alternatives proposed within the study area.

At the initiation of this study a Needs Based Implementation Plan (NBIP) for the State Route 179 (SR 179) corridor had been completed. The NBIP identified improvements that would be constructed along the SR 179 corridor from the intersection with SR 89A (known as the "Y") to south of the Village of Oak Creek. The improvements identified included converting twelve (12) conventional intersections along the corridor to roundabout intersections. Throughout the duration of this study the Final Design of the improvements along SR 179 was under way, and construction of the improvements is expected to begin in Spring 2007. The SR 179 improvements includes reconstruction of two intersections to a roundabout configuration along SR 89A that are adjacent to the study area of this project, namely Brewer Road and the SR 179 intersection known as the "Y". The construction of these roundabouts is expected to be completed in Summer 2008, and therefore is considered an existing situation for the Soldiers Pass Area Traffic Study.

Current and projected traffic along SR 89A is expected to warrant traffic signals at numerous intersections along SR 89A, and the City of Sedona has received inquiries from several neighborhoods along the corridor requesting consideration for the installation of new traffic signals. Within the study area, there is currently a traffic signal at Soldiers Pass Road, however future traffic conditions are expected to warrant traffic signals at the intersections of Saddlerock Circle and Airport Road. The installation of traffic signals at Saddlerock Circle and Airport Road, while maintaining a traffic signal at Soldiers Pass Road, would not be desirable because of the close proximity of these intersections to each other.

PROJECT PURPOSE

The purpose of this traffic study is to propose solutions within the study area that can provide convenient access to SR 89A for users within the study area, while maintaining favorable traffic operations along the corridor. Proposed solutions must be evaluated to ensure they are compatible with the access management objectives of the community plan and current engineering practices, while serving as a guide for future development or improvements along SR 89A.

Level of service analyses were conducted to determine the traffic operations along the existing SR 89A corridor, and the traffic operations that can be expected in the year 2025 if no improvements are made in the area. The concept of Level of Service (LOS) uses qualitative measures that characterize operational conditions within traffic streams and their perception by motorists and passengers. The descriptions of individual levels of service characterize these conditions in terms of factors such as speed and travel time, delay, freedom to maneuver, traffic interruptions, comfort and convenience. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations, from A to F, with LOS A representing the best operating conditions and LOS F the worst.

The existing intersection level of service analyses results for the 2005 traffic data are displayed in Table EX.1, and 2025 conditions with no improvements in Table EX.2.

Table EX.1 – 2005 Existing Intersection Levels of Service

Control	Location	2005 Peak Hour	
2-way Stop	Oak Creek Blvd/SR 89A	NB	E
2-way Stop	Posse Ground Rd/SR 89A	SB	D
2-way Stop	Saddlerock Circle/SR 89A	NB SB	E E
Signal	Soldiers Pass Rd/SR 89A	All	B
2-way Stop	Airport Rd/SR 89A	NB SB	F F
2-way Stop	Les Springs Dr/SR 89A	NB	C

Table EX.2 – Year 2025 No-Build Intersection Levels of Service

Control	Location	2005 Peak Hour	
2-way Stop	Oak Creek Blvd/SR 89A	NB	F
2-way Stop	Posse Ground Rd/SR 89A	SB	F
2-way Stop	Saddlerock Circle/SR 89A	NB SB	F F
Signal	Soldiers Pass Rd/SR 89A	All	B
2-way Stop	Airport Rd/SR 89A	NB SB	F F
2-way Stop	Les Springs Dr/SR 89A	NB	E

Note: Stop control LOS is for intersection approach.

Year 2025 no-build intersection levels of service results indicate that the existing stop controlled intersections on SR 89A will not be sufficient for projected future traffic demands for this area. The existing intersections will need to be improved prior to this analysis year in order to achieve acceptable levels of service along the corridor.

In order to identify issues and concerns and to generate feasible concepts, a Concept Workshop was conducted in August of 2005, which included a representative cross section of interested stakeholders within the study area. Six Concepts were proposed and presented to the public at a meeting on September 22, 2005. The concepts included the following;

Palo Verde Alternative

Palo Verde would implement a traffic signal at the intersection of Airport Road and SR 89A, and no other roadway improvements would be included. The distance between Soldiers Pass Road and Airport Road is less than desirable for two traffic signals on a major highway and could make signal coordination difficult.

Mesquite Alternative

This alternative would implement a roadway connection parallel to SR 89A between Airport Road and Saddlerock Circle south of the highway. An extension of Soldiers Pass Road south of SR 89A would allow access from this roadway to SR 89A. Airport Road could be realigned further to the east providing quarter mile spacing for another traffic signal along SR 89A.

Sycamore Alternative

This alternative would relocate Soldiers Pass Road to intersect SR 89A opposite Airport Road, and a traffic signal would be installed at this new intersection. The traffic signal at Soldiers Pass Road would be removed. If warranted, a traffic signal could also be installed at Saddlerock Circle while still maintaining desirable separation between the traffic signals.

Desert Willow Alternative

Desert Willow would implement a roadway connection parallel to SR 89A between Airport Road and Saddlerock Circle. Elk Road would allow access from this roadway to SR 89A. This would allow access to a traffic signal from the south while avoiding the removal of Biddle's Outdoor Center.

Acacia Alternative

Four roundabout intersections would be constructed at Les Springs Road, Airport Road, Soldiers Pass Road, and Posse Ground Road. The roundabout intersections provide control for all movements at these locations without the use of any traffic signals. A raised median would be implemented along the highway, limiting left turn and U-turn movements to the roundabouts.

Ironwood Alternative

Roundabout intersections would be constructed at Soldiers Pass Road and Airport Road. The roundabout intersections provide control for all movements at these locations without the use of any traffic signals. A raised median would be implemented along the highway, limiting left turn and U-turn movements to the roundabouts.

An engineering evaluation was performed on each concept and the results of that evaluation combined with public and stakeholder input resulted in the 6 concept being refined and combined to become 3 feasible alternatives as follows;

Jackrabbit Alternative

The Jackrabbit Alternative is the refined version of the Level 1 Mesquite Alternative. The alternative would maintain a signalized intersection at Soldiers Pass Road with a roadway extension of Soldiers Pass Road south of SR 89A. The new roadway would provide the traffic accessing SR 89A from Airport Mesa, Les Springs Drive, and Saddlerock Circle an opportunity to access a traffic signal at Soldiers Pass Road. SR 89A would be widened 5' on each side to provide for raised medians and bike lanes. Bus pull-outs would be provided on the departure side of the signalized intersections, which also accommodates u-turn movements at these intersections. The Airport Road and Saddlerock Circle intersections would become right-in/right-out access points. The raised 16' medians provide access control from Old Marketplace through Airport Road. An additional median between Oak Creek Blvd and Posse Ground Road maybe included to prevent left-in movements into both intersections; this access control was considered to reduce cut through traffic along Posse Ground Road.

Javelina Alternative

The Javelina Alternative is a combination of the Palo Verde and Sycamore Alternatives included in the Level 1 evaluation. The alternative involves the initial implementation of a signal at Airport Road. Soldiers Pass Road would then be realigned to North Airport Road to provide a connection to Airport Road. Traffic from Airport Mesa, Les Springs Drive, and Soldiers Pass Road would have access to SR 89A at this traffic signal at Airport Road. The signal at existing Soldiers Pass Road would be removed, and the intersection would become a right-in/right-out access point. A second traffic signal would be provided at Saddlerock Circle when traffic signal warrants are met. SR 89A would be widened 5' on each side to provide for raised medians and bike lanes. Bus pull-outs would be provided on the departure side of the signalized intersections, which also accommodates u-turn movements at these intersections. The raised 16' medians would provide access control from Old Marketplace through Airport Road.

Coyote Alternative

The Coyote Alternative is a combination of the Level 1 Acacia and Ironwood alternatives; the multiple roundabouts could be implemented individually. Roundabouts are provided at three intersections: Posse Ground Road which would be connected to Oak Creek Blvd; Soldiers Pass Road; and Airport Road. A 4' median and bike lanes would be provided without widening SR 89A. The 4' raised median would provide access control from Posse Ground Road through Airport Road. The Saddlerock Circle intersection becomes a right in/right-out access point; however, the roundabouts provide multiple u-turn opportunities throughout the corridor. Saddlerock Circle and Les Springs Drive traffic would have access to SR 89A at the Airport Road roundabout.

These three alternatives were presented to the public at a meeting on November 15, 2005. Based on an engineering evaluation, direct input from the public meeting, and follow up meetings with the key project stakeholders, two alternatives are considered to be the most feasible for the study area. The following sections describe refinements made to each alternative based on the public and key stakeholders input, and the distinguishing features of each.

PREFERRED JAVELINA ALTERNATIVE

The basic concept of the Javelina Alternative is to provide convenient access to SR 89A for most of the users in the study area. This is accomplished with two new traffic signals at Airport Road and Saddlerock Circle; the existing traffic signal at Soldiers Pass Road would be removed.

A refinement was made to this alternative to become the Preferred Javelina Alternative, which includes upgrading the alignment of North Airport Road to a collector street. This will require the street be widened and continuous sidewalks added. The upgrade of North Airport Road to a collector street would require parking be eliminated along the street, and parking removed near the intersection of North Airport Road and Soldiers Pass Road. To mitigate for this removal of parking, a parking lot is proposed north of the roadway that could be utilized by patrons for businesses along Soldiers Pass Road, the Best Western Inn of Sedona, and St. Johns Vianney Church. The Preferred Javelina Alternative is depicted in Figure EX.1

Year 2025 intersection level of service results for the Preferred Javelina Alternative are shown in Table EX.3.

Table EX.3 – Year 2025 Preferred Javelina Alternative Intersection Levels of Service

Control	Location	2005 Peak Hour	
2-way Stop	Oak Creek Blvd/SR 89A	NB	F
2-way Stop	Posse Ground Rd/SR 89A	SB	C
Signal	Saddlerock Circle/SR 89A	All	A
2-way Stop	Soldiers Pass Rd/SR 89A	NB SB	B B
Signal	Airport Rd/SR 89A	All	C
2-way Stop	Les Springs Dr/SR 89A	NB	C
2-way Stop	Rolling Hills Dr/SR 89A	NB	F

Note: Stop control LOS is for intersection approach.

The intersection analyses results for the Javelina Alternative indicate that the refined proposed alternative intersections will operate at acceptable LOS within the peak hour of the day. However, the intersections at Oak Creek Blvd/SR 89A and Rolling Hills Dr were not improved and therefore operate at the same LOS as in the No Build scenario.

The traffic signal proposed at Airport Road would provide convenient access to SR 89A from Airport Mesa and the neighborhoods of Les Springs and Saddlerock Homes. This traffic signal will also provide convenient access to SR 89A for those who currently use the traffic signal at Soldiers Pass Road, by using North Airport Road to the traffic signal. To help encourage this movement, the existing intersection at Soldiers Pass Road is proposed to be converted to right in/right out. Therefore a portion of the existing movements would still be provided at the existing intersection, but drivers wishing to make left turn movements to and from Soldiers Pass Road would use the new traffic signal at Airport Road.

The traffic signal proposed at Saddlerock Circle would provide access to SR 89A for the Old Marketplace commercial development and the neighborhood of Saddlerock Homes. All other intersections and driveways would be limited to right in and right out movements; however, the intersections at Airport Road and Saddlerock Circle would be designed to provide for easy u-turn movements. Far side transit pullout bays will be implemented at each intersection and this additional pavement width will allow for u-turn movements.

The total costs estimated for the Preferred Javalina Alternative is $4.8 Million. These costs include approximately $1.7 Million for construction of the improvements and $3.1 Million estimated for Right of Way and property impacts.

Saddlerock Circle:
Install new signal

Soldiers Pass Road:
Remove signal

Airport Road:
Install new signal

Legend:

- Proposed roadway
- Proposed pathway
- Right in, right out

N
W E
S

Figure EX.1

Preferred Javelina Alternative
Soldiers Pass Road Area Traffic Study

DMJM HARRIS | AECOM

PREFERRED COYOTE ALTERNATIVE

The concept of the Coyote Alternative is to provide convenient access to SR 89A at three roundabout intersections for most of the users in the study area. The roundabouts would be located at Airport Road, Soldiers Pass Road, and Posse Ground Road.

Year 2025 intersection level of service results for the Preferred Coyote Alternative are shown in Table EX.4.

Table EX.4 – Year 2025 Preferred Coyote Alternative Intersection Levels of Service

Control	Location	2005 Peak Hour	
2-way Stop	Oak Creek Blvd/SR 89A	NB	F
RB	Posse Ground Rd/SR 89A	ALL	B
2-way Stop	Saddlerock Circle/SR 89A	NB SB	C D
RB	Soldiers Pass Rd/SR 89A	All	A
RB	Airport Rd/SR 89A	All	A
2-way Stop	Les Springs Dr/SR 89A	NB	C
2-way Stop	Rolling Hills Dr/SR 89A	NB	F

Note: Stop control LOS is for intersection approach.

The roundabout intersection at Posse Ground Road connects directly with Birch Blvd. This roundabout would provide convenient access to residents living within the Birch Blvd and Willow Way neighborhood, who currently do not have access to a controlled intersection. The location of this intersection will maximize the spacing between the proposed roundabout intersection and the traffic signal at Northview/Mountain Shadows. Spacing between traffic signals and roundabouts should be maximized to ensure optimum traffic operations at each location. The Preferred Coyote Alternative is depicted in Figure EX.2.

The roundabout intersection proposed at Airport Road would provide convenient access to SR 89A from Airport Mesa and the neighborhoods of Les Springs and Saddlerock Homes. The roundabout intersection at Soldiers Pass Road would provide convenient access to SR 89A for those who currently use the traffic signal at Soldiers Pass Road.

All other intersections and driveways would be limited to right in / right out movements; however the roundabout intersections at Airport Road, Soldiers Pass Road, and Posse Ground Road would provide easy u-turn movements, allowing all movements from each driveway with minimal out of direction travel.

The total costs estimated for the Preferred Coyote Alternative is $3.1 Million. These costs include approximately $1.4 Million for construction of the improvements and $1.7 Million estimated for Right of Way and property impacts.

New roundabout locations:

- Posse Ground Rd
- Soldiers Pass Rd
- Airport Rd

Legend:

Proposed roadway

Right in, right out

N
W
E
S

Figure EX.2

Preferred Coyote Alternative
Soldiers Pass Road Area Traffic Study

DMJM HARRIS | AECOM

PREFERRED JACKRABBIT ALTERNATIVE

The concept of the Jackrabbit Alternative is to provide convenient access to SR 89A with the implementation of local roadways connecting Airport Road and Saddlerock Circle to the signalized intersection located at Soldiers Pass Road. The new local roadway(s) would complete the 4th leg of this signalized intersection to provide access south of SR 89A.

Year 2025 intersection level of service results for the Preferred Jackrabbit Alternative are shown in Table EX.4.

Table EX.5 – Year 2025 Jackrabbit Alternative Intersection Levels of Service

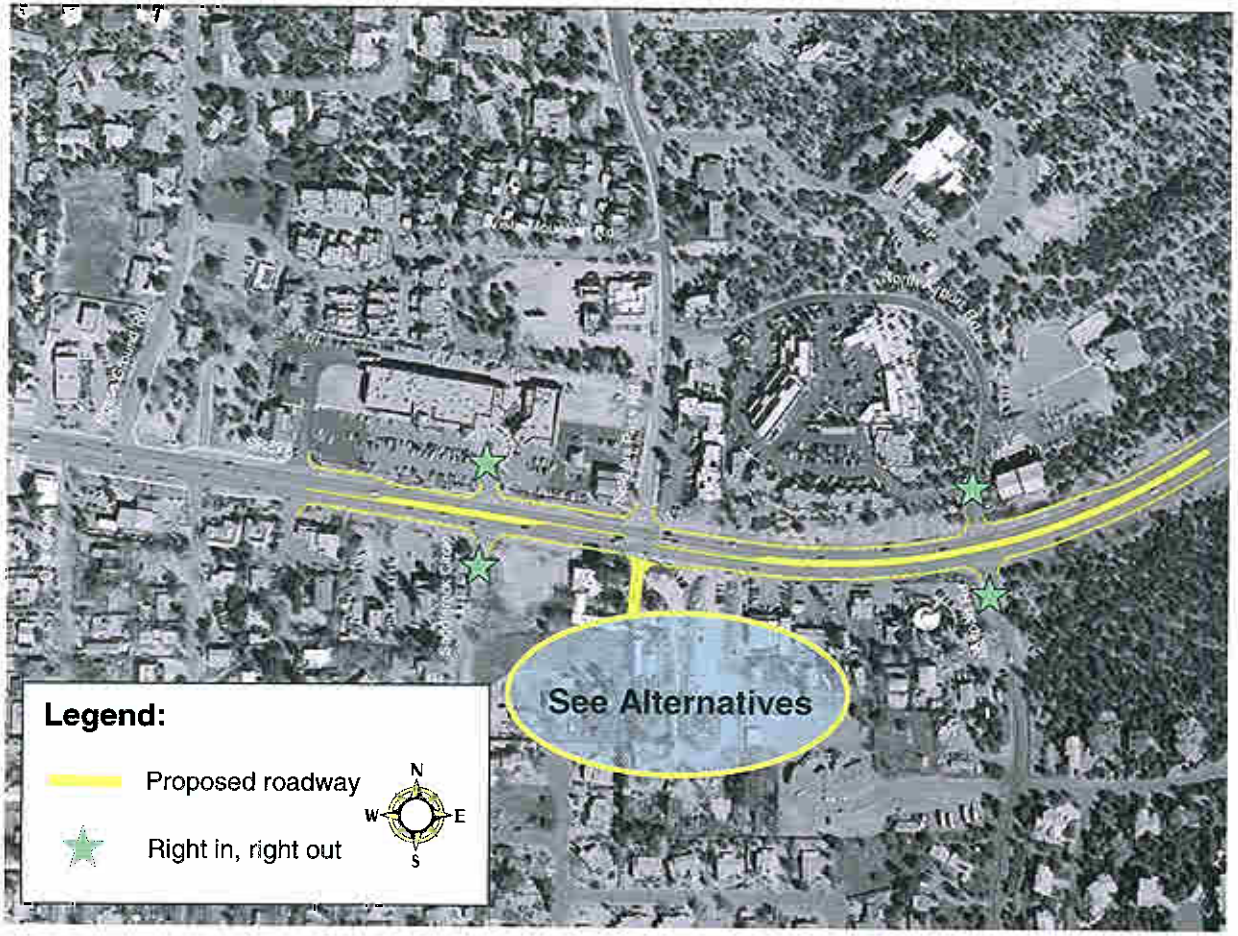
Control	Location	2005 Peak Hour	
2-way Stop	Oak Creek Blvd/SR 89A	NB	F
2-way Stop	Posse Ground Rd/SR 89A	SB	F
2-way Stop	Saddlerock Circle/SR 89A	NB SB	C B
Signal	Soldiers Pass Rd/SR 89A	NB/SB	C
2-way Stop	Airport Rd/SR 89A	NB SB	B C
2-way Stop	Les Springs Dr/SR 89A	NB	C
2-way Stop	Rolling Hills Dr/SR 89A	NB	F

The alternative includes ideas of how a local roadway system could connect the neighborhoods south of SR 89A to the intersection at Soldiers Pass Road. The Jackrabbit Alternative is depicted in Figure EX.3.

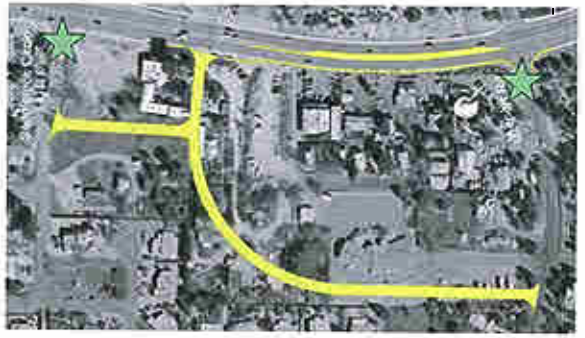
The SR 89A typical section contains four travel lanes (two in each direction); a 16-foot raised median; on-street bicycle lanes, and a sidewalk on each side. To achieve this typical section, existing SR 89A would need to be widened a total of 10 feet (5 feet on each side). The raised median along SR 89A is proposed to begin at the West Entrance Drive to the Marketplace and extend east of Airport Road. This control of access is proposed to limit the number of turning movements along this section of SR 89A and encourage users to access the highway at the Soldiers Pass traffic.

The Jackrabbit Alternative requires a local street network connecting Airport Road and Saddlerock Circle to the south leg of the Soldiers Pass Intersection. Planning of this roadway network will need to be coordinated with any redevelopment plans of properties south of SR 89A. Involvement of the Saddlerock Neighborhood would be encouraged during this planning process to help ensure concerns of cut-through traffic and potential noise impacts are addressed.

The total costs estimated for the Preferred Jackrabbit Alternative is $7.5 Million. These costs include approximately $1.7 million dollars for construction and an estimated right of way cost of $5.8 million dollars.



Soldiers Pass Road:
Signal to remain



Alternative 1

Alternative 2

Figure EX.3

Preferred Jackrabbit Alternative
Soldiers Pass Road Area Traffic Study

DMJM HARRIS | AECOM

CONCLUSION

The three preferred alternatives will each improve future traffic operations within the study area, reducing delays on the crossroads, while maintaining reasonable access to the adjacent commercial developments on SR 89A. All alternatives include improving SR 89A to provide access control and multi-modal facilities.

The Preferred Javelina Alternative includes two signalized intersections at Airport Road and Saddlerock Circle, with roadway improvements to North Airport Road. All intersections, with the exception of Oak Creek Blvd, are anticipated to operate at LOS C or better.

The Preferred Coyote Alternative includes three roundabout intersections at Airport Road, Soldiers Pass Road, and Posse Ground Road. This alternative requires a realignment of Posse Ground Road to align with the intersection of Birch Road. All intersections, with the exception of Oak Creek Blvd. and the Old Marketplace driveway, are anticipated to operate at LOS "D" or better.

The Preferred Jackrabbit Alternative includes roadway connections south of SR 89A that provide access to the fourth (south) leg of the Soldiers Pass Road intersection. This alternative provides access benefits to the areas south of SR 89A, and the potential impacts are limited primarily to properties south of the highway.

All of these alternatives will provide an effective long-range planning solution to the SR 89A Soldiers Pass Road area. Eventually one of the preferred concepts will need to be chosen as the long range planning solution for the study area. Each of the alternatives provide an acceptable engineering solution to the traffic capacity and access control issues along SR 89A, however a decision will need to be made determining which concept will become the long range solution for the area.

An interim solution is proposed to improve traffic operations and highway access for the study area until a long range solution is decided. The interim solution includes constructing a traffic signal at Airport Road, which will improve access to SR 89A from neighborhoods south of the highway. However, because of the close spacing between the traffic signal at Soldiers Pass Road and the proposed signal at Airport Road, this can only be considered an interim solution. Traffic volumes on SR 89A are expected to increase, and this may cause traffic queues to impact the operations of these traffic signals.

The traffic model indicates once traffic volumes reach an increase of 25%-30% above existing volumes, the traffic queue is expected to extend into the Airport Road intersection. The results of a Queuing Analysis between Soldiers Pass and Airport Road is shown in Table EX. 6.

Table EX. 6 – Queuing analysis between Soldiers Pass and Airport Road traffic signals

Design Year	Westbound SR 89A Volume	Volume increase over Existing (%)	Length of Westbound SR 89A Queue (ft)*	Approximate distance between intersections**	Amount of distance between intersections occupied by Queue (%)
Existing (2005)	1253 Veh/hr	n/a	436 ft	740 ft	59%
2025	1465 Veh/hr	17%	653 ft	740 ft	88%
2025+	1610 Veh/hr	28%	774 ft	740 ft	105%

* - 95th percentile queue formed by the Soldiers Pass traffic signal
** - approximate distance available for queuing between Soldiers Pass and Airport Roads

Implementation of a traffic signal at Airport Road is considered a short-term solution, and there must be a commitment to implement a long-term solution based on certain implementation triggers. Several anticipated implementation triggers are listed below:

- Traffic Queues along SR 89A
- Redevelopment plans submitted for property within the study area
- Roundabout Intersections

These implementation triggers are further described in Section 9 of this report.

The intersection at the entrance to the Rolling Hills neighborhood is not proposed for improvements in any of the Preferred Alternatives. It was determined that no feasible solutions exist to improve this intersection based on the existing geometry of the intersecting roadway. In light of this conclusion, City staff has suggested that consideration should be given to a connection between the Rolling Hills neighborhood and Brewer Road as a possible mitigation of this access issue. Intersection operations at the Rolling Hills intersection with SR 89A is expected to be more favorable with the selection of the Preferred Javalina Alternative because traffic gaps will still be produced from the traffic signal located at Airport Road. Implementation of a roundabout intersection at Airport Road in combination with the roundabout being implemented at Brewer Road will create more random traffic flows and may further degrade operations at the Rolling Hills intersection.